

# **Basics of Weapons of Mass Destruction**



# What are WMD?<sup>1</sup>

- Any destructive device including any explosive, incendiary, or poison gas
- Any weapon that is designed or intended to cause death or bodily injury through the release, dissemination, or impact of toxic or poisonous chemicals, or their precursors
- Any weapon involving a disease organism, or
- Any weapon that is designed to release radiation or radioactivity at a level dangerous to human life

1. 18 USC Sections 2332a and 921(a)(4)(A)

# What is a CBRNE Incident?

- CBRNE - Chemical, Biological, Radiological, Nuclear, Explosive
- Deliberate or unintentional events
- Potential to produce catastrophic loss of life or property or strike terror in the affected population

# Differences Between WMD Incidents and Other Incidents<sup>1</sup>

1. Situation may not be recognizable until there are multiple casualties
2. There may be multiple events
3. Responders are placed at a higher risk of becoming casualties
4. The location of the incident will be treated as a crime scene
5. Contamination of critical facilities and large geographic areas may result

1. FEMA: Concept of Operations Plan – Situation,  
[www.fema.gov/rrr/conplan/conpln3b.shtm](http://www.fema.gov/rrr/conplan/conpln3b.shtm)

# Differences Between WMD Incidents and Other Incidents<sup>1</sup>

6. Scope of the incident may expand geometrically and may affect mutual aid jurisdictions
7. There will be a stronger reaction from the public than with other types of incidents
8. Time is working against responding elements
9. Support facilities are at risk as targets
10. Specialized State and local response capabilities may be overwhelmed

1. FEMA: Concept of Operations Plan – Situation,  
[www.fema.gov/rrr/conplan/conpln3b.shtm](http://www.fema.gov/rrr/conplan/conpln3b.shtm)

# Types of Terrorist Threats to Transportation Facilities

- Structural/functional damage/destruction resulting from portable, truck-or boat-borne explosives and fire damage
- Casualties from blast or fire
- System shutdown via exposure and contamination from biological and/or chemical WMD, e.g., introduced through tunnel vents
- Collateral damage to other lifelines, e.g., telecommunications, power, and pipelines carried along bridges or tunnels



# **CBRNE Characteristics**

# Chemical Agents

- Intended to kill, seriously injure, or incapacitate people through physiological effects
- Incidents demand immediate reaction from emergency responders
- Can be introduced through aerosol devices, breaking containers, or covert dissemination



# Types of Chemical Agents

Choking	Blood	Blister	Nerve	Tear
<ul style="list-style-type: none"><li>• Chlorine</li><li>• Diphosgene</li><li>• Cyanide</li><li>• Nitrogen Oxide</li><li>• Perfluroriso-butylene</li><li>• Phosgene</li><li>• Red Phosphorous</li><li>• Titanium Tetrachloride</li><li>• Zinc Oxide</li></ul>	<ul style="list-style-type: none"><li>• Arsine</li><li>• Cyanogen Chloride</li><li>• Hydrogen Chloride</li><li>• Hydrogen Cyanide</li></ul>	<ul style="list-style-type: none"><li>• Distilled Mustard</li><li>• Lewisite</li><li>• Mustard Gas</li><li>• Nitrogen Mustard</li><li>• Phosgene Oxime</li><li>• Ethyldichloroarsine</li><li>• Methyldichloroarsine</li></ul>	<ul style="list-style-type: none"><li>• Cyclohexyl Sarin</li><li>• GE</li><li>• Sarin</li><li>• Soman</li><li>• Tabun</li><li>• VE</li><li>• VG</li><li>• V-Gas</li><li>• VM</li><li>• VX</li></ul>	<ul style="list-style-type: none"><li>• Bromobenzylcyanide</li><li>• Chloroacetophenone</li><li>• Chloropicrin</li><li>• CNB</li><li>• CNC</li><li>• CNS</li><li>• CR</li><li>• CS</li></ul>

# Characteristics of an Incident Involving a Chemical Agent

- Effects mostly local to release site but may be distributed beyond release site by wind and contamination
- Area may be marked by unusual clouds, haze, mist, odors, tastes, droplets, etc.
- May be persistent in environment

# Indicators of Possible Chemical Agent Use

- Stated threat to release a chemical agent
- Initial unexplained casualties and illnesses
- Unusual liquid, spray or vapor
- Suspicious devices or packages

# Biological Agents

- Recognition of a biological hazard can occur through identification of a credible threat, discovery of bioterrorism evidence, diagnosis, and detection
- Delay between exposure and onset of illness
- Victims may serve as carriers of the disease with the capability of infecting others
- Could affect agricultural commodities over a large area

# Types of Biological Agents

Bacteria	Viruses	Toxins
<ul style="list-style-type: none"><li>• Anthrax</li><li>• Q-Fever</li><li>• Tularemia</li><li>• Psittacosis</li><li>• Glanders</li><li>• RMSF</li><li>• Melioidosis</li><li>• Brucellosis</li><li>• Plague</li></ul>	<ul style="list-style-type: none"><li>• Dengue Fever</li><li>• Equine Encephalitis</li><li>• Hantaan</li><li>• Congo-Crimean HF</li><li>• Chikungunya</li><li>• Variola</li><li>• Ebola</li><li>• Smallpox</li></ul>	<ul style="list-style-type: none"><li>• Botulinum</li><li>• SEB</li><li>• Perfringens</li><li>• Ricin</li><li>• Saxitoxin</li><li>• Tetrodotoxin</li><li>• Mycotoxins</li></ul>

# Characteristics of an Incident Involving a Biological Agent

- Immediate effects mostly local to release but may be expanded distribution through human transmittal
- Possible persistence in environment
- Possible geographic contamination

# Indicators of Possible Biological Agent Use

- Stated threat to release a biological agent
- Initial unexplained deaths and illness possibly beginning a day or more after an incident
- Unusual occurrence of dead or dying animals
- Unusual casualties
- Unusual liquid, spray or vapor

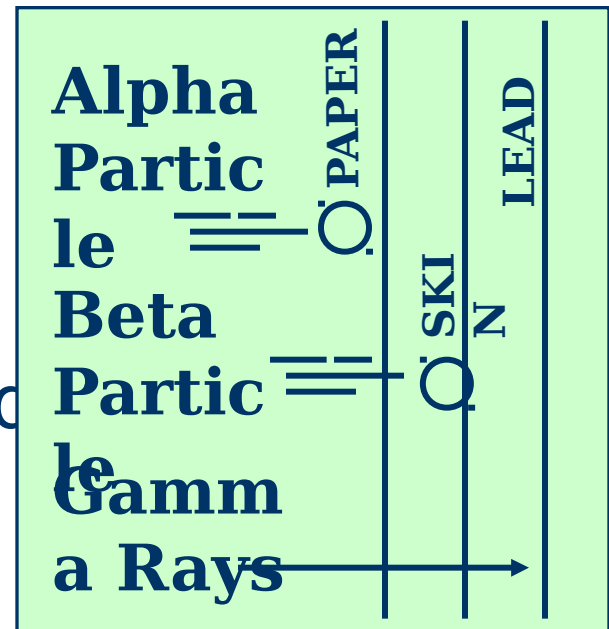
# Radiological Agents/Nuclear Weapons

- An attack may be difficult to detect - the presence of radioactive material may or may not be obvious
- Different devices may be used to launch an attack:
  - Improvised Nuclear Device (IND)
  - Radiological Dispersal Device (RDD)
  - Simple RDD



# Types of Nuclear Radiation Emitted From Radioactive Materials

- Alpha Radiation
  - Internal hazard
- Beta Radiation
  - Slight or Internal hazard
- Gamma Radiation
  - Acute hazard



# Indicators of Possible Radiological Agent/Nuclear Weapon Use

(e.g., dispersion of radioactive material by non-nuclear explosion or pressurized gas, nuclear detonation with radioactive fallout)

- A stated threat to deploy a nuclear or radiological device
- Unexplained deaths and illness
- The presence of nuclear or radiological equipment (e.g., spent fuel canisters or nuclear transport vehicles)
- Nuclear placards or warning materials along with otherwise unexplained casualties

# Characteristics of an Incident Involving a Radiological Agent or Nuclear Weapon

- Effects mostly local to release but may be some distribution via, e.g, wind beyond release site
- Persistence in environment
- Geographic contamination
- Extensive radioactive fallout
- Radioactive poisoning of foodstuffs, water sources and long-term illnesses
- Large-scale infrastructure destruction
- Conventional explosive used for dispersal may cause additional effects and explosions

# Conventional Explosive Devices

- Easiest to obtain and use
- May be used to cause massive local destruction or to disperse chemical, biological or radiological agents
- Characterized as being explosive or incendiary, employing high or low filler explosive materials to explode and/or cause fires

# High Explosives

- RDX
- ANFO (Ammonium nitrate fuel oil solution)
- Potassium Chlorate
- Nitrostarch Explosives
- Picric Acid (Tri-Nitro-Phenol)
- Ammonium Picrate (Explosive-D)
- Lead Azide
- Dynamite

# Relative Destructive Forces of Explosives

Explosive Type	Detonation Velocity (km/s)	Overpressure Conversion Factor	Charge Required
TNT	6.94	1	1 lb.
RDX	8.64	1.3	0.75 lbs.
ANFO	5	0.4	2.4 lbs.

# **Indicators of Use of Conventional Explosive Devices**

(e.g., detonation of military type or commercial bombs, such as fuel, oil-fertilizer, etc.)



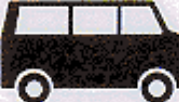



- Explosions
- Casualties
- Various types of localized blast damage up to structural collapse
- Exposure to dust and hazardous building materials, e.g., asbestos

# Types of Explosive Weapon Threats to Highway Assets

- Portable, hand-placed charges placed on or near structures, e.g., 100 pounds of C4
- Vehicle or boat-borne explosives, e.g., 4,000 pounds of explosives of fertilizer/oil mix (ANFO)
- Up to 60,000 pounds of explosive delivered in a semi-trailer or boats of various sizes



# Vehicle Bomb Explosion Effects

<b>ATF</b>	<b>VEHICLE DESCRIPTION</b>	<b>MAXIMUM EXPLOSIVES CAPACITY</b>	<b>LETHAL AIR BLAST RANGE</b>	<b>MINIMUM EVACUATION DISTANCE</b>	<b>FALLING GLASS HAZARD</b>
	COMPACT SEDAN	500 Pounds 227 Kilos (In Trunk)	<b>100 Feet</b> <b>30 Meters</b>	<b>1,500 Feet</b> <b>457 Meters</b>	1,250 Feet 381 Meters
	FULL SIZE SEDAN	1,000 Pounds 455 Kilos (In Trunk)	<b>125 Feet</b> <b>38 Meters</b>	<b>1,750 Feet</b> <b>534 Meters</b>	1,750 Feet 534 Meters
	PASSENGER VAN OR CARGO VAN	4,000 Pounds 1,818 Kilos	<b>200 Feet</b> <b>61 Meters</b>	<b>2,750 Feet</b> <b>838 Meters</b>	2,750 Feet 838 Meters
	SMALL BOX VAN (14 FT BOX)	10,000 Pounds 4,545 Kilos	<b>300 Feet</b> <b>91 Meters</b>	<b>3,750 Feet</b> <b>1,143 Meters</b>	3,750 Feet 1,143 Meters
	BOX VAN OR WATER/FUEL TRUCK	30,000 Pounds 13,636 Kilos	<b>450 Feet</b> <b>137 Meters</b>	<b>6,500 Feet</b> <b>1,982 Meters</b>	6,500 Feet 1,982 Meters
	SEMI-TRAILER	60,000 Pounds 27,273 Kilos	<b>600 Feet</b> <b>183 Meters</b>	<b>7,000 Feet</b> <b>2,134 Meters</b>	7,000 Feet 2,134 Meters

Source: Federal Alcohol, Tobacco and Firearms Agency website

# Combined Hazards

- WMD agents can be combined to achieve a synergistic effect
- Mixed infections or intoxications may occur
- Casualties may suffer from multiple effects
- Potential exists for multiple incidents in single or multiple municipalities

# Initial Detection of a WMD Terrorist Attack

- Will likely occur at the local level by either first responders or private entities
- State and local health departments and local emergency first responders will identify unusual symptoms and symptom patterns
- First responders must be protected from the hazard

# Investigation and Containment of Hazards

- The proper local, State and Federal authorities capable of dealing with and containing the hazard should be alerted to a suspected WMD attack after State or local health departments recognize the occurrence of unusual or unknown symptoms

# Federal Response

- FEMA is authorized to support the DOJ until the Attorney General transfers the overall lead role to FEMA
- FEMA is designated as the lead agency for consequence management within the U.S. and its territories
- Federal response will include experts in the identification, containment, and recovery of WMD

# Resources

- “Guide for All-Hazard Emergency Operations Planning”, State and Local Guide (101), Chapter 6, Attachment G- Terrorism, FEMA, April 2001
- “Emergency Response to Terrorism, Self-Study”, FEMA/USFA/NFA-ERT:SS, June 1999
- “Surface Transportation Vulnerability Assessment”, U.S. DOT, RSPA, Volpe Center, Oct. 25, 2001
- “A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection”,  
<http://security.transportation.org/community/security/guides.html>
- FEMA: Concept of Operations Plan – Situation,  
[www.fema.gov/rrr/conplan/conpln3b.shtm](http://www.fema.gov/rrr/conplan/conpln3b.shtm)
- Various other WMD related websites